NC Fire Environment Committee Meeting

May 28-29, 2024

Foothills Higher Education Center in Morganton, NC, and virtual via Teams

Red text denotes action items

Welcome and Introduction

- Jonathon Pearson is primary representative for NCFS Region 1
- NCFS Region 2 currently has 2 vacant positions on the FEC
    - Keith Money will transition to management team
- Keith Kelley now representing USFS
- Nick Luchetti is replacing Jimmy Taeger as representative (and the fire weather program manager) for NWS Raleigh

Review and Discussion of Minutes from January 2024 Meeting

- Since last meeting, NWS shared direct phone lines with NCFS, which has been helpful
- Prescribed Fire Plan update: management team met recently after having a comment period; some discussion about size classes (useful for BlueSky runs) and requested clarification about notifying adjoining landowners about a burn
    - Would plan to pare down the agency burn plan and include in the SMP as a guide
- Jamie still working on best practices for live fuel moisture sampling
- Minutes are approved

State Climate Office Updates (Corey Davis)

- Seasonal Climate Update
    - This winter was wet thanks to the El Niño pattern, while spring has alternated from wet to dry each month (including a wet May)
        - Similar to past post-El Niño springs, which had lots of variability
    - Summer outlook favors warm and wet conditions in NC, with potential early-season tropical activity
    - Likely to be an active hurricane season due to warm sea surface temperatures across the tropical Atlantic and the developing La Niña, which typically provides a more favorable upper-level wind pattern for tropical storms
        - NOAA's outlook calls for 17 to 25 named storms (average is 14), 8 to 13 hurricanes (average is 7), and 4 to 7 major hurricanes (average is 3)
    - If the La Niña does develop, it could see us get drier later in the fall, but ongoing tropical activity could continue to be a wildcard
- Fire Weather Portal Renovations
    - As a reminder, renovations will help give a fresh look to the tool, make it easier to add new features (such as FDRA aggregations), and meet interest from NC and other southeastern states

    - Recent changes include addition of Fosberg fine dead fuel moisture, export options for map screenshots and meteograms, fuel model selection for NFDRS data, and 7-day summary tables for FDRAs
    - New site is live and accepting feedback: https://products.climate.ncsu.edu/fire
    - Plan to keep the existing Portal online while development continues on the new site, with a region-wide rollout ongoing this summer and fall
        - Interest in NC, and potentially from specific organizations such as TNC, in more tailored rollout webinars
    - Ongoing or planned developments include adding remaining gridded datasets + support for gridded data meteograms (i.e., view all hourly forecasts for a single point), adding other Fire/Smoke/Hazard layers such as the satellite-detected fires and smoke plumes from NOAA OSPO (same as in AirFire), and adding the updated gridded KBDI dataset (initial results show it's more accurate than the previous version, potentially correcting the underestimation of daily maximum temperatures)
    - What other datasets or features do you want to see?
        - For FDRA-aggregated precipitation, use a 1300 to 1300 timescale to match NFDRS timing
        - Would like to see RH recovery (see NWS updates)
    - Also plan to update the Resources for NCFS at least with the same fresh coat of paint as the main Portal; could be a good chance to make other updates
        - Observed and Forecast Matrix by District
            - Used frequently by multiple people, including pointing to that site as part of daily briefings
            - Would like the ability to link directly to a district's section
        - Weekly Outlook tool
            - Used frequently to check 7-day forecasts at a glance
            - Corey will check on availability of the 7-day weather forecast
                - These are pulled on the fly from the NWS API, but started having issues during a recent NWS data center outage
        - Hazard Assessment Tool
            - Also a good reference to see conditions across an FDRA
        - Station Status tool
            - Not frequently used but can help show data outages/issues
        - Quality Control Viewer
            - Still useful when used in tandem with the daily QC emails
- ECONet Overview and Applications
    - ECONet is North Carolina's mesonet, with 44 full towers + 4 partial stations
    - Began in 1978 to aid with monitoring for agriculture, but has expanded and now supports many different applications

    - For new stations, need funding (~$20K for installation and ~$5K for annual maintenance), a representative area clear of obstructions, and ideally, a local partner who will use the data
    - SCO conducts both routine maintenance (3 times per year) and emergency maintenance as needed
    - All stations measure data every minute and communicate (usually via cell modem) every 5 minutes
    - Automated quality control is run hourly and data flagged by level of possible failure
    - Instrumentation includes multiple wind, temperature, relative humidity, and precipitation sensors
        - Inclusion of 6-meter wind sensors meets RAWS/NFDRS standards
    - 2-meter and 9-meter temperature sensors supports inversion monitoring to inform dicamba spraying
        - Potential application for nighttime smoke dispersion?
    - Leaf wetness sensors inform pesticide management and plant disease models
        - Potential application as a proxy for fuel moisture – maybe similar to the RAWS weighted fuel sticks?
    - Data can be accessed via the Fire Weather Portal, ECONet website (including the Snapshot Viewer), and Cardinal/Station Scout
    - Goal is to have one station per county, but getting there via sustainable growth
    - Planned new stations this year in Morganton (at NC School of Science and Math) and Morehead City (at CMAST)

FEMS Updates (Scott Linn, National Program Manager for NFDRS with US Forest Service)

- Useful resources:
    - FEMS website: https://fems.fs2c.usda.gov
    - FEMS web portal: https://www.wildfire.gov/application/fems
    - SJSU web portal for Field Sample: https://www.nfmdb.org
- Overall vision for FEMS (Fire Environment Mapping System) is to provide weather, fire danger, and fuel moisture displays of point and gridded data from national to local level decision support, and ensure data consistency and integrity for all products
- Have developed a basic site with integrated weather data on a map
- Currently pulling in weather data from WXx Weather; in the future, will use WXx Weather to update stations (for RAWS) or Synoptic (for mesonets)
- Historical data since 2000 is available and can be downloaded in FW21 or CSV format
- Data includes all permanent stations (not portable RAWS) with a WIMS ID, but working on getting additional stations by July
- Field Sample section will house the National Fuel Moisture Database, showing sampled live fuel moisture data
    - Still working to add visualizations; until they're added, use the SJSU web portal

- Also still working on the point-based fire danger display, plus adjusting catalogs of stations and automating some data retrieval such as annual average precipitation
    - Catalogs would support changing fuel models, including if any additional fuel models are added in the future – managed at the national/regional level
- Plan to add some components of FireFamilyPlus into FEMS, which will make for more consistency in outputs and analyses
- Transition from WIMS to FEMS projected to begin in mid to late July, with more fire danger data display early next year and a full transition (sunsetting WIMS) in 2025
- Working with Synoptic Labs to get Alternate Gateway stations (including ECONet) into FEMS – likely early next year
- Backfilled weather data goes from 2000 until station began reporting, and gap-filled data after that to provide realistic estimates of missing observations through 2022
    - Also includes QCed data
    - This data will be the basis for the NFDRS POR (Period of Record) v1 dataset, which includes data from 2005-2022 – this will be operational in FEMS
- Automated snow flag
    - Snow flag is updated once daily in NFDRSv4, at 06 GMT
    - Uses information from the National Snow and Ice Data Center and Snow Data Assimilation System (modeled using satellite-derived information)
- FEMS is publicly accessible in the US; for data download and editing, need to login (and editing, as with field samples, requires having a role assigned)

NWS Updates (Nick Luchetti, NWS Raleigh)

- Coming in 2025: NWS fire weather forecasts will no longer include the Haines Index or Lightning Activity Level
    - National Fire Behavior Subcommittee supported the removal of Haines Index since it was developed as experimental, not useful in the Southeast or Western US, and was being misinterpreted
    - LAL was not science-based; fire tower operators would count the number of strikes per minute
    - LAL will be replaced by the probability of thunder in Fire Weather Forecasts
        - Coarse plots from NBM: https://blend.mdl.nws.noaa.gov/nbm-images
        - Could potentially be added to the Fire Weather Portal as well? Corey will check since Portal already includes some NBM data
    - For real-time lightning data, consider LightningCast (based on GOES satellite imagery, trained by AI)
- Spot Forecast request webpage is getting a major upgrade this summer, moving to more stable IT infrastructure
    - Current page will redirect to the new one (https://spot.weather.gov) beginning June 25
- NWS Raleigh is currently the only office to include RH recovery in forecasts
    - Currently using simple statistics, and a max RH of > 50% is considered excellent

    - Some western areas use a percentage-based max minus min calculation
    - Would like to explore this more, make improvements, and potentially recommend adoption by other NWS offices that forecast for NC
    - Consider including the timing, such as “excellent after 2 am”
- NWS transitioning to new OPS model over the next 5 to 10 years, which will include a change in workflow to allow more eye-to-eye decision support
    - Also transitioning some products to more probabilistic guidance

DAQ Updates (Tammy Manning, NCDAQ)

- PM2.5 NAAQS was updated by EPA, effective May 6
    - Primary annual PM2.5 NAAQS was lowered from 12.0 to 9.0 µg/m³
    - The only AQI category that the breakpoints did not change was Orange. All the other category breakpoints (Green, Yellow, Red, Purple and Maroon) were modified (at least one breakpoint for the category was lowered).
    - For Green and Red - the upper breakpoint was lowered, Yellow – the lower breakpoint was lowered to 9.1, for Purple – both breakpoints were lowered and for Maroon – there is only breakpoint now and it is lower than the previous breakpoints.
    - Link to the EPA table that shows the changes: https://www.epa.gov/system/files/documents/2024-02/pm-naaqs-air-quality-index-fact-sheet.pdf
- Two monitors in NC had PM2.5 design values > 9.0 for 2021-2023 (including certified data): Davidson County and Remount monitor in Mecklenburg County
    - Will work with EPA to recommend designation for these areas, using Exceptional Events demonstration for events such as Canadian wildfire smoke and fireworks, which should put these sites back within attainment
- Info sheet has been drafted with an overview of the changed NAAQS and larger-scale context and resources

Georgia Tabletop Exercise & NC Planning (Jamie Dunbar)

- EPA scheduled and led this three-day event in January to bring many partners together and discuss decision-making and communication for prescribed burning and smoke management, and develop working groups that are still active
- Might hold a similar event in NC (although probably not led by EPA)
    - May start recruiting: please reach out to Jamie Dunbar, Thomas Crate, or Carmella Stirrat to help identify your organization’s lead/representative

Outreach Note for DAQ Regional Staff (Jamie Dunbar)

- At recent MOU meeting between DAQ and NCFS, DAQ asked if district foresters could meet with regional air quality staff

RAWS Status, Contracting, FDOP (Jamie Dunbar)

- New contract went in place in October with FTS direct
    - Looking to get back to a BLM service contract
    - Planning to keep 6 portables (2 per region)
    - Could new stations be added? No funding on NCFS's side, but what if other groups (State Parks?) wanted to purchase one? How would that work with the management contract?
        - Wildlife Resources Commission might be interested as well
- FDOP work will pick up in the new fiscal year

Live Fuel Moisture Sampling (Jamie Dunbar)

- Jamie started sampling in timber company plantations (pine, hardwoods, laurel, greenbrier) in the Beaufort County area over the past four weeks
- D4 had done some sampling, and hoping that might resume
    - Equipment including oven and scales are available
- DuPont Recreational Forest remains our active long-term site in NC for laurel and rhododendron

SMP Revision Follow-Up (Jamie Dunbar)

- Has been available since mid-December, and is in use this spring
- Jamie will send to NCFS along with the info document about NAAQS
- When burn plan draft is finalized on NCFS side, Jamie will follow up about including a version of it in the appendix
- Jamie has talked with Dan Chan and NCFS IT about setting up VSMOKE Web on an NCDA site; hoping to have code transferred and something set up in a few months
- The Smoke Management Database cannot be edited after burns are closed out; please remember to update those (such as actual acres burned and tons per acre consumed) before closing out
    - Access from fiResponse dashboard; look under Incidents for NCFS Smoke Management link
    - Jamie has requested fiResponse staff change zero values to null as part of the next version, so that zeroes would only show if nothing was burned
- ADM class will be held after this meeting, beginning at 1 pm today (May 29)

Smoke Monitoring and Evaluating Impacts (Jeremy Ash and Gisele Majidi-Weese, USFS R8 Air Program Staff)

- Smoke monitoring helps evaluate impacts on and communicate with the public, quantify wildfire vs. prescribed fire tradeoffs, establish nuisance thresholds, isolate impacts across a shared airshed, and verify predictions from smoke models
- Types of smoke monitoring equipment
    - Particulate matter sensors
        - Gravimetric monitors (filter-based that weighs the mass) are labor-intensive, semi-permanent, and very accurate but slow to return data

                - Include high-volume samplers and IMPROVE aerosol samplers
                - Because of their accuracy, they tend to be approved by EPA for measurement of attainment with NAAQS (those are called Federal Reference Monitors, or FRMs)
            - Optical monitors (measures light scattering or light absorption, which is then converted to a concentration) are real-time and portable, and relatively inexpensive ($15k to $20k) compared to permanent monitors, but less accurate than gravimetric monitors
            - Beta attenuation monitors (BAMs) collect particulate on a tape and radiation directed across the tape at a sensor; these tend to be used to produce AQI information
                - Similarly, E-BAMs are smaller versions that are portable and relatively inexpensive
            - Low-cost sensors (less than $2,500) provide real-time measurements and are easy to deploy, but with a short averaging time (averaging over minutes instead of an hour) and a shorter lifespan (~2 years assuming continual running)
                - Including PurpleAir ($250 to $300)
    - Visibility (primarily in Class I areas, measuring full spectrum of pollutants)
        - Finely tuned and QA/QCed data
    - Camera networks
        - Can help document conditions during a burn
    - Satellite data
        - Can be helpful for monitoring, although it may not pick up small fires and can be hindered by cloud cover or timing of satellite passes
        - Example: https://worldview.earthdata.nasa.gov
    - Other monitors
        - Mobile BAMs unit that is mounted to a car window and can detect concentrations while driving around an area
        - “THINGY” sensor that’s easy to deploy and can detect different pollutants
        - Lascar pen that detects carbon monoxide
- Three main monitoring objectives
    - Project impact monitoring/case study (such as a prescribed burn)
        - Needs real-time information
        - Could be short-term (one burn) or long-term (a full burn season)
        - Typically focused on a localized area or community
        - Equipment could include E-BAMs, e-samplers, and low-cost sensors
    - NAAQS monitoring
        - Over a long time period and a larger area
        - A lag time is probably okay
        - Equipment is mainly gravimetric and other approved FRM monitors
    - Visibility monitoring

        - Also over a longer time period, such as regional haze in Class I areas
        - Equipment includes IMPROVE and cameras
- Air monitoring rules
    - State regulatory agencies concerned with public health; want the highest standard for accuracy; always FRM monitors
    - Land managers want to track and assessing programs, so less accuracy okay if the data is more timely
- Considerations for where to monitor
    - Sensitive locations: schools, daycares, hospitals, nursing homes, county fairs
    - Far from local pollution sources, such as dirt roads, wood stoves, traffic
    - Need access to line power?
    - Permission (on private property)
    - Environmental justice – use tools such as EJScreen (https://ejscreen.epa.gov/mapper/) or Climate and Economic Justice Screening Tool (https://screeningtool.geoplatform.gov/en)
- When to monitor
    - Depends on objectives: project impacts (hourly for several days before/during/after a project) vs. permanent network (regular data collection over a longer period of time)
- Smoke monitoring kits
    - E-samplers with GOES satellite modems
    - Available from National Incident Smoke Monitor Support Cache (NISMSC)
    - Order from a local fire dispatch center – need a job code
        - https://www.wildlandfiresmoke.net/smoke-monitor-ordering
- E-BAM training aids
    - Forest Service user's guide included with instrument
    - Videos available about setup and usage
- Quality assurance
    - Maintain and calibrate instruments per manufacturer specs
- Websites for tracking conditions
    - Fire and Smoke Map (fire.airnow.gov)
        - Will usually pull in temporary monitors and PurpleAirs, but using QA/QC to make sure both sensors are in line with each other
    - Fire Cache Smoke Monitor Archive (https://wrcc.dri.edu/cgi-bin/smoke.pl)
    - State-level AQI websites (for NC, the Ambient Information Reporter tool: https://airquality.climate.ncsu.edu/air)
- Effectiveness of smoke management
    - Monitoring can help assess the effectiveness
    - Coordinate with other programs
        - Use EPA and state monitoring data
        - Locate monitors where no data is available
        - Use visibility data to monitor Class I areas

- Integration into burn plans
    - Define an acceptable PM concentration threshold for nearby communities or Class I areas
    - Compare monitoring results and documented complaints to the established concentration thresholds
    - Modify future burn plans to produce lower PM concentrations in nearby communities or Class I areas
- Monitoring reports
    - Include photos, monitoring data, smoke models
- Followed by hands-on exercise to assemble an e-sampler

Training Needs and Opportunities

- S-390 coming up next week
- Rx-310 in 2 weeks in Crossnore
- Local staff at Foothills Higher Education Center mentioned S-130/S-190 needs
- Discussion about certified burner course
    - Thomas Crate: could use some additional training/practice with burn plan writing
    - David Greathouse: there's demand for the certified burner course, but is it achieving its goals or do we need to do more to ensure success?
        - Prescribed burn associations will be key – invite them to be a part of the course?
        - And have county/district staff (such as county ranger or ACR) at the course, too
    - Jamie Dunbar: some attendees seem to be taking the course to learn more about it, but not going further, or no-showing on field days
    - May want to evaluate the success: Is acreage burned going up? Is the number of certified burners going up? Or what else can we do post-training?
- Let's explore holding Rx-410 in North Carolina – it continues coming up as a need
- Notes from NWCG Fire Behavior Subcommittee (David Greathouse)
    - In spring meeting, x90 courses are all being rewritten; all will likely be more of a hybrid of in-person and virtual
        - New S-290 has been handed off to NWCG for approval and awaiting comments from executive committee; should be a test course before the end of the year
        - S-390 still being reworked
        - S-490 changes will depend on S-390, especially how much it covers Behave (and awaiting the release of Behave 7)
        - S-590 likely to stay mostly the same
    - S-491 has been recommended as a prerequisite for Fire Behavior Analyst; waiting for executive committee to approve and NWCG to sign off
    - Subcommittee is finalizing a virtual Mann Gulch staff ride
- Fire Learning field trips coming up in late June or early July in the Mountains

Agency and Program Updates

- NC Forest Service Fire Staff (Jamie Dunbar and Wes Sketo)
    - Kevin Harvell was recently promoted to forest protection section director (replacing Greg Hicks)
- NC Forest Service Region 1 (John Cook, James Caddy)
    - D7: down to 2 vacancies, good year for prescribed burning especially in February
    - Regionwide, 15 to 20% vacancies – down from the mid-30s
        - But lots of new people means getting them more training
- NC Forest Service Region 2 (Keith Money and Gary McLendon)
    - 22 to 25 vacancies, depending on hiring rate and turnover
    - D3 and D10 had good prescribed burn years
        - D3: high Burn Category days with light winds at the surface allowed for good burning
- NC Forest Service Region 3 (David Greathouse and Robb Davis)
    - Several vacancies
    - Good prescribed burn season especially in D2 with lots of acreage
    - Normal wildfire season
    - 2 new people with BlueSky capabilities, including Robb
    - Lots of training coming up in Crossnore in June, including medical incident response training for new firefighters on Friday
- NC Wildlife Resources Commission (Casey Phillips)
    - 250 prescribed burns for ~27,000 acres
    - Good contingent of staff in recent and upcoming training courses
    - Working to get more foresters certified for ADM
        - Hoping for ~15 BlueSky certified by next year
    - Working toward a new MOU after the last one expired in December
- NC Division of Air Quality
    - Request: please notify DAQ if a project fire is starting since that assists with their air quality forecasting
- NC State Parks (Thomas Crate)
    - 180 vacancies statewide
    - Restructuring underway: the fire section is being pushed to operations ("uniformed" staff) but shouldn't change anything with partners
    - Also working on an updated MOU, and still have an active cost agreement (MOA) with NCFS
    - Michael Huffman now onboard as statewide equipment coordinator
    - Laura Webster is coastal coordinator, Jason Haywood in the Piedmont, Andrew Slack is mountain coordinator
    - Banner year for prescribed burning
    - Putting together a second crew based at Cliffs of Neuse, plus existing crew at Lake Norman, and trying to put a third crew together in the Sandhills

    - Good collaborative training, including Engine Academy with multiple agencies and states represented
- US Fish & Wildlife Service (Caleb Jones)
    - Lots of turnover and retirements recently
    - NC used to be a standalone zone for USFWS, but NC and SC are now together
        - FMO for that zone is vacant but will be hired soon
    - Lots of fuelbreak work: in 2022, 20 miles per 600 acres at Pocosin Lakes; in 2023, 10 breaks (3 new ones) at Alligator River; putting in a big break at Pains Bay
    - Buying an amphibious excavator
    - Lots of tracts prescribed burned (15 units) for just under 10,000 acres
- National Park Service (Chris Corrigan)
    - Shane Paxton retired in January; his position has not been filled
    - Greg Salansky retired in April
    - Chris has moved to Fire Planner position
    - Good prescribed fire year
    - NPS is requiring FMPs moved to a new template
        - Cape Hatteras National Seashore is done, and planning to do more burning out there
- BIA (Reese Kerbow)
    - [Notes from MS Teams Chat] We're trying to hire 10 overhead positions, 6 WG HVY Equip Operators (WG10 and WG08), and Fire/Fuels Module (10-P) within the Region (some will be stationed @ Cherokee Agency), and FMO, 8-person ENG module at Cherokee Agency.
- DOD (Pete Steponkus/Jamie Dunbar)
    - Active prescribed burn season
    - Soil moisture station is active there, but need to do more calibration or adjustment of the sensors and/or remeasuring the bulk density
    - Looking to replace the Sandy Run RAWS tower
- The Nature Conservancy (Carmella Stirrat)
    - Burning numbers are down a little, but have some growing season burns still planned
    - Green Swamp media day on June 4 highlighting the effects one year post-fire
    - Pulp Road fire was the largest on TNC property across the country last year
    - Working on expanding some crew lead positions to year-round in the Mountains and Coastal Plain (already have those in the Sandhills)
    - Supporting certified burner field days
    - See need for more S-230, S-231, and S-211 courses (long wait lists at the moment and some courses were canceled last year)
- State Climate Office (Corey Davis)
    - New contract with NCFS is written and should take effect July 1

        - Will cover ongoing maintenance for the Portal, RAWS QC + emails, monthly weather outlooks, plus other items we identify as useful
    - New extension specialist and post-doc starting this summer to help with other projects
- Prescribed Fire Council (Wes Sketo)
    - Annual meeting on August 13-14 in Brevard
        - Registration will open soon
    - Ongoing conversation about whether there should be a designated point of contact for the FEC (different from the president)

Location and Date for Next Meeting

- Assuming no bad hurricanes or fall fire issues, aiming for October/November
- Jamie will send a Doodle poll to pick the date later in July.
- Plan to go back to Jockey's Ridge State Park since last year's meeting there was canceled